

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 1. (Currently amended) A method for quantifying a number of identical
2 consecutive digits starting from a fixed position within a string of n digits,
3 comprising:
4 converting the string of n digits into a thermometer code, wherein the
5 thermometer code uses m bits to represent a string of m identical consecutive
6 digits within the string of n digits;
7 wherein converting the string of digits into the thermometer code involves
8 passing the string of digits through $\lceil \log_m n \rceil$ layers of m -input AND gates, wherein
9 for the case where $m=2$, a first layer of AND gates produces thermometer codes
10 for sub-strings of length two, and wherein each consecutive layer produces
11 thermometer codes for sub-strings of length $k+1$ to $2k$ by ANDing together
12 thermometer codes for sub-strings of length 1 to k from preceding layers;
13 converting the thermometer code into a one-hot code in which only one bit
14 has a logical one value; and
15 converting the one-hot code into a logarithmic code representing the
16 number of identical consecutive digits.

1 2 (Canceled).

1 3. (Original) The method of claim 1,

2 wherein converting the thermometer code into the one-hot code involves
3 passing the thermometer code through a single layer of two-input comparator
4 gates;
5 wherein a given comparator gate produces a logical one value when a first
6 input of the comparator gate receives a logical one value and a second input
7 receives a logical zero value; and
8 wherein a comparator gate is coupled between each consecutive pair of
9 thermometer code bits, so that only one comparator gate, covering a boundary
10 between consecutive logical ones and consecutive logical zeros, produces a
11 logical one value.

1 4. (Original) The method of claim 1, wherein converting the one-hot code
2 into the logarithmic code involves passing the one-hot code through $\lceil \log_2 n \rceil - 1$
3 layers of OR gates, wherein a given bit in the logarithmic code is produced by
4 ORing together bits of the one-hot code that cause the given bit in the logarithmic
5 code to be asserted.

1 5. (Original) The method of claim 1, wherein the string of n digits is a
2 string of n binary digits.

1 6. (Original) The method of claim 1, wherein the fixed position in the
2 string of n digits is the beginning of the string, so that the number of leading
3 identical consecutive digits is quantified.

1 7. (Original) The method of claim 6, wherein the number of leading zero
2 values is quantified.

1 8. (Original) The method of claim 7, further comprising using the
2 logarithmic code to normalize a result of a floating-point arithmetic operation.

1 9. (Original) The method of claim 1, further comprising using the
2 logarithmic code to encode or decode a stream of data, wherein the logarithmic
3 code represents a run-length of identical consecutive digits within the stream of
4 data.

1 10. (Original) The method of claim 1, wherein each digit in the string of n
2 digits includes one or more binary digits.

1 11. (Currently amended) An apparatus that quantifies a number of
2 identical consecutive digits starting from a fixed position within a string of n
3 digits, comprising:
4 a thermometer code circuit that converts the string of n digits into a
5 thermometer code, wherein the thermometer code uses m bits to represent a string
6 of m identical consecutive digits within the string of n digits;
7 wherein the thermometer code circuit includes $\lceil \log_m n \rceil$ layers of m -input
8 AND gates, wherein for the case where $m=2$, a first layer of AND gates produces
9 thermometer codes for sub-strings of length two, and wherein each consecutive
10 layer produces thermometer codes for sub-strings of length $k+1$ to $2k$ by ANDing
11 together thermometer codes for sub-strings of length 1 to k from preceding layers;
12 a one-hot code circuit that converts the thermometer code into a one-hot
13 code in which only one bit has a logical one value; and
14 a logarithmic code circuit that converts the one-hot code into a logarithmic
15 code representing the number of identical consecutive digits.

1 12 (Canceled).

1 13. (Original) The apparatus of claim 11,
2 wherein the one-hot-code circuit includes a single layer of two-input
3 comparator gates;
4 wherein a given comparator gate produces a logical one value when a first
5 input of the comparator gate receives a logical one value and a second input
6 receives a logical zero value; and
7 wherein a comparator gate is coupled between each consecutive pair of
8 thermometer code bits, so that only one comparator gate, covering a boundary
9 between consecutive logical ones and consecutive logical zeros, produces a
10 logical one value.

1 14. (Original) The apparatus of claim 11, wherein the logarithmic code
2 circuit includes $\lceil \log_2 n \rceil - 1$ layers of OR gates, wherein a given bit in the
3 logarithmic code is produced by ORing together bits of the one-hot code that
4 cause the given bit in the logarithmic code to be asserted.

1 15. (Original) The apparatus of claim 11, wherein the string of n digits is a
2 string of n binary digits.

1 16. (Original) The apparatus of claim 11, wherein the fixed position in the
2 string of n digits is the beginning of the string, so that the number of leading
3 identical consecutive digits is quantified.

1 17. (Original) The apparatus of claim 16, wherein the apparatus quantifies
2 the number of leading zero values.

1 18. (Original) The apparatus of claim 17, further comprising a floating-
2 point arithmetic unit that is configured to use the logarithmic code to normalize a
3 result of a floating-point arithmetic operation.

1 19. (Original) The apparatus of claim 11, further comprising an encoder
2 that is configured to use the logarithmic code to encode or decode a stream of
3 data, wherein the logarithmic code represents a run-length of identical consecutive
4 digits within the stream of data.

1 20. (Original) The apparatus of claim 11, wherein each digit in the string
2 of n digits includes one or more binary digits.

1 21. (Currently amended) A computer system including a circuit that
2 quantifies a number of identical consecutive digits, comprising:
3 a processor;
4 a memory;
5 a quantifying circuit that quantifies the number of identical consecutive
6 digits starting from a fixed position within a string of n digits, wherein the
7 quantifying circuit includes,
8 a thermometer code circuit that converts the string of n
9 digits into a thermometer code, wherein the thermometer code uses
10 m bits to represent a string of m identical consecutive digits within
11 the string of n digits;
12 wherein the thermometer code circuit includes $\lceil \log_m n \rceil$
13 layers of m -input AND gates, wherein for the case when $m=2$, a
14 first layer of AND gates produces thermometer codes for sub-
15 strings of length two, and wherein each consecutive layer produces
16 thermometer codes for sub-strings of length $k+1$ to $2k$ by ANDing

17 | together thermometer codes for sub-strings of length 1 to k from
18 | preceding layers.

19 | a one-hot code circuit that converts the thermometer code
20 | into a one-hot code in which only one bit has a logical one value,
21 | and

22 | a logarithmic code circuit that converts the one-hot code
23 | into a logarithmic code representing the number of identical
24 | consecutive digits.

1 | 22. (Original) The computer system of claim 21, further comprising:
2 | a floating-point arithmetic unit of within the processor;
3 | wherein the quantifying circuit is located within the floating-point
4 | arithmetic unit and is configured to normalize results of floating-point operations.

1 | 23. (Original) The computer system of claim 21,
2 | wherein the computer system includes an encoding circuit for encoding or
3 | decoding streams of data; and
4 | wherein the quantifying circuit is located within the encoding circuit and is
5 | configured to quantify run-lengths of identical consecutive digits for the encoding
6 | circuit.